Space Weather Forecast

Issued on Tuesday, 10 October 2023 at 01:27 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Isolated M-class flares likely. Chance G1 Minor Storm intervals day 1-3 (09-11 Oct) from coronal hole fast winds and Coronal Mass Ejection (CME) arrival.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low frequent common class flares, the strongest from the moderately sized sunspot region in the northwest. There are eight sunspot regions visible. The northwestern spot is the largest and most magnetically complex, with ongoing slow growth and the persistence of a weak mixed polarity spot on its trailer spot. There is a further smaller, but also complex region, which has seen ongoing consolidation of its small spots into a more defined trailer and leader setup, however this also has a moderately strong mixed polarity spot present on its trailer. The remaining regions are all smaller and simpler. No Earth-directed CMEs (coronal mass ejections) have been detected.

Solar Wind / Geomagnetic Activity: Solar winds have persisted at generally slow wind conditions, with no definitive indication of the arrival of the fast winds from a coronal hole. The solar wind speed was at background but with a slow rising trend from 310kms to 350 km/s. Total interplanetary magnetic field (IMF) strength was weak. The north-south component has also been largely weak and negative (southward) with only brief positive (northward) spells. Geomagnetic activity has been Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background levels, with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is expected with isolated Moderate flares likely. There is a slight chance of very isolated Strong flare, from either of the two complex sunspots, one in the northwest and the other in the southeast.

Solar Wind / Geomagnetic Activity: There is one Earth-directed CME, with expected arrival either late day 2 or early day 3 (11-12 Oct). Current slow wind is likely to transition into the faster winds from a pair of coronal holes through day 1 and 2 (10-11 Oct). This likely bringing peak winds of around 500-600 km/s. Quiet geomagnetic activity will increase to Unsettled to Active at times of days 1-3 (10-12 Oct) with the onset of the fast winds or more likely with the CME arrival. There is a slight chance of G1 Minor Storms day 1-2 (10-11 Oct) with the fast wind enhancements, and a chance G1-G2 Minor Storm intervals day 2-3 (11-12 Oct) with any CME arrival.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is most likely to remain at background levels, but with a slight chance if any notable flares occur from either of the complex sunspots on the disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	30	30	1
Strong	G3	No	1	5	5	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	60	55	50	45
Very Active	R3 to R5 X	No	10	10	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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